Project Title: Connect Four Game with AI Using Minimax Algorithm

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1. Introduction:

This project implements the classic Connect Four game with an AI opponent using the Minimax algorithm enhanced with alpha-beta pruning. The game is developed in Python using the Pygame library for graphical rendering.

2. Objective:

To create a playable Connect Four game where the user competes against an intelligent computer opponent.

3. Technologies Used:

* Language: Python

* Libraries: NumPy, Pygame

* Algorithm: Minimax with alpha-beta pruning

4. Features:

* Two-player mode (User vs AI)

* AI uses strategic evaluation to choose the best move

* Graphical interface for gameplay

5. Game Rules:

* Two players drop colored discs in a 7-column, 6-row grid

* The first player to form a horizontal, vertical, or diagonal line of four of their own discs wins

6. Core Functionalities:

* Board creation and display

* Player and AI move logic

* Win detection (horizontal, vertical, diagonal)

* AI decision-making via Minimax

7. Minimax Algorithm:

* Recursively evaluates possible moves to a given depth

* Uses score evaluation to choose optimal moves

* Alpha-beta pruning optimizes search time

8. Conclusion:

This project successfully simulates a Connect Four game with a competitive AI opponent. It combines game logic, graphical interface, and artificial intelligence concepts.

9. Future Enhancements:

* Difficulty levels by adjusting Minimax depth

* Multiplayer over network

* Enhanced UI/UX